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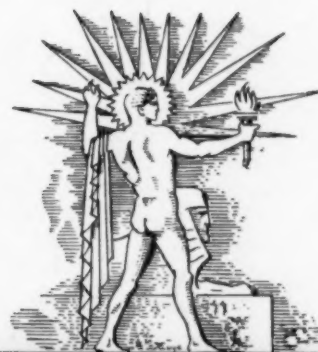
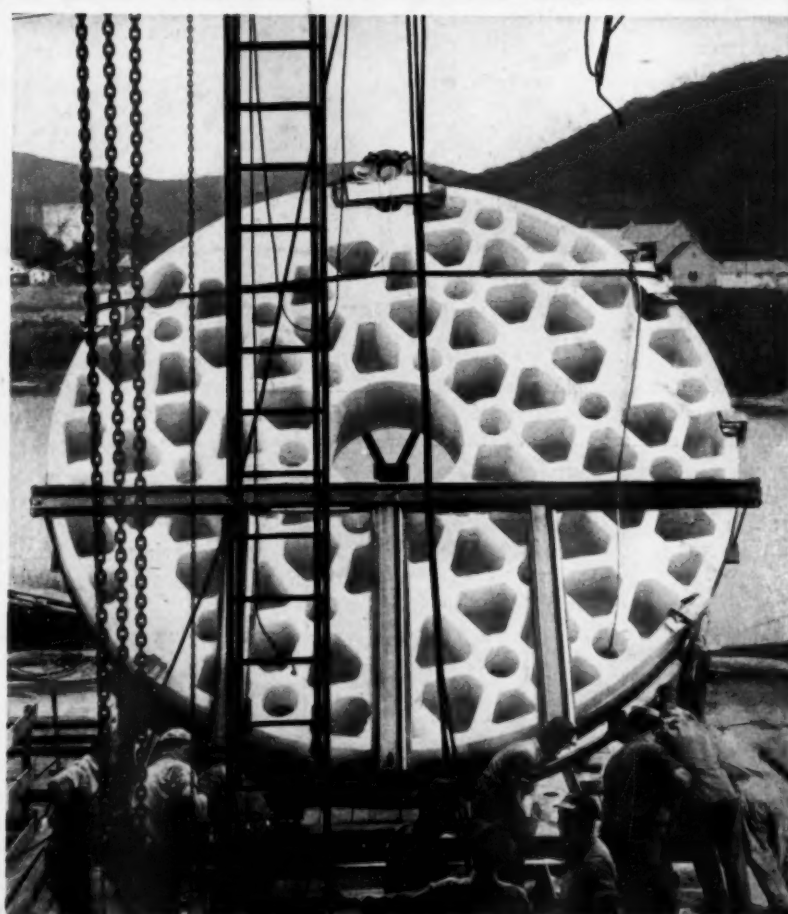
SCIENCE NEWS LETTER

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AUG 29 1939

DETROIT

THE WEEKLY SUMMARY OF CURRENT SCIENCE •



August 26, 1939

Unusual Monument

See page 137

A SCIENCE SERVICE PUBLICATION

Do You Know?

Japan has a record wheat crop this year.

There are 16,000,000 thunderstorms a year throughout the world.

The desert tortoise is now protected in California by a law prohibiting sale of these animals.

About one-half the men who apply for positions in the flying cadets fail because of poor eyesight.

Although Down House, the home of Charles Darwin, is not easy to reach from London, it is visited by over 7,000 people a year.

Marble statues that remain in the sea for a long time usually are injured by corrosion or barnacles, but bronzes suffer little damage.

The Buffalo Museum of Science is exhibiting modern stylish hats and primitive headgear to compare the arts and artifacts of the world's peoples.

On recommendation of the League of Nations, 21 countries have formed national nutrition committees, to find out what foods their people lack for health.

Soviet Russia is trying the experiment of giving medical students a five-year course, of which the first three years are the same for all, and in the last two the student chooses between general medicine, public health, or diseases of children.

SCIENCE NEWS LETTER

Vol. 36 AUGUST 26, 1939 No. 9

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QUESTIONS DISCUSSED IN THIS ISSUE

Most articles which appear in SCIENCE NEWS LETTER are based on communications to Science Service, or on papers before meetings. Where published sources are used they are referred to in the article.

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PUBLIC HEALTH

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Some kinds of cockroaches require five years to grow up.

A six-foot globe showing the earth's features accurately in full relief is a new geographic product.

Airplanes were catapulted for the first time in polar exploration during the recent German Antarctic Expedition.

A fifteenth century writer described a greyhound as a dog with "the head of a snake, the neck of a drake, the foot of a cat, the tail of a rat, the side of a bearm, and the back like a beam."

Some guinea pigs bred for show have hair so long the animal resembles a mop.

Fishes' eyes are so placed that they can scarcely see below the level of the head.

English physicians used to carry a gold headed cane with herbs in the hollow head, believing this would protect them from diseases.

An ancient writer said that the Greeks made their spears so that, if the head broke off, the spear could be reversed and the butt became a striking weapon.

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EUGENICS

Plan for Improving Population Drawn by Famed Geneticists

All Could Be Geniuses in World Based on Biology; World Federation Needed; Birth Control Advocated

A PLAN for the improvement of the world's population by scientific methods has been developed as the result of a question put by Science Service to world leaders in science attending the Seventh International Congress of Genetics in Edinburgh, Scotland.

"How could the world's population be improved most effectively genetically?" was the query cabled by Watson Davis, director of Science Service, to leading participants in the Congress.

A group of British scientists answered this difficult problem with a declaration that is virtually a biological blueprint for a better humanity.

The need for better economic and social conditions is stressed.

"Everyone might look upon 'genius', combined of course with stability, as his birthright," is one striking prospect if the suggestions are followed.

Some effective sort of federation of the whole world, based on the common interests of all its peoples, is demanded to remove conditions which make for war and economic exploitation.

The Signers

The scientists signing the joint declaration are:

Dr. F. A. E. Crew, general secretary of the Seventh International Congress of Genetics, and director of the Institute of Animal Genetics, University of Edinburgh.

Dr. C. D. Darlington, who next October becomes director of Britain's famous John Innes Horticultural Institution.

Prof. J. B. S. Haldane, professor of biometry, University College, London, author of various books, including "Heredity and Politics," etc.

Dr. S. C. Harland, British geneticist recently connected with the Instituto Agronomico do Estado, Sao Paulo, Brazil.

Prof. Lancelot T. Hogben, professor of natural history, Marischal College, Aberdeen, author of "Mathematics for the Millions," "Science for the Citizen," etc.

Prof. Julian S. Huxley, secretary of

the Zoological Society of London, author of many science books.

Dr. H. J. Muller, Institute of Animal Genetics, University of Edinburgh, who while professor at the University of Texas won the 1927 American Association for the Advancement of Science prize for artificial production of gene mutations.

Declaring that the question of population improvement is not merely a biological one, the scientists say that the worth of individuals can not be compared without economic and social conditions which provide approximately equal opportunities for all members of society.

A major hindrance to improvement in human heredity is declared to lie in the economic and political conditions which foster antagonism between different peoples, nations and "races."

In order to raise children effectively, parents and particularly mothers must have economic security and such economic, medical, educational and other aids that additional children will not overburden them. Living conditions should be reshaped with the good of the children as one of their main objectives.

Birth control, both positive and negative, is declared a prerequisite to human

improvement. The superstitious attitude toward sex and reproduction now prevalent needs to be replaced by a scientific and social attitude.

In a better ordered world "it would be regarded as an honor and a privilege, if not a duty, for a mother, married or unmarried, to have the best children possible, both in respect to their upbringing and of their genetic endowment." Artificial, though always voluntary, control over the process of parentage, is contemplated in some cases.

The effect of a bettered environment is not passed on by heredity and therefore the next generation can be made better only by some kind of selection.

Conscious selection is recommended to improve those genetic characteristics which make for health, for intelligence, and for those temperamental qualities which favor fellow-feeling and social behavior rather than the personal "success" most esteemed today.

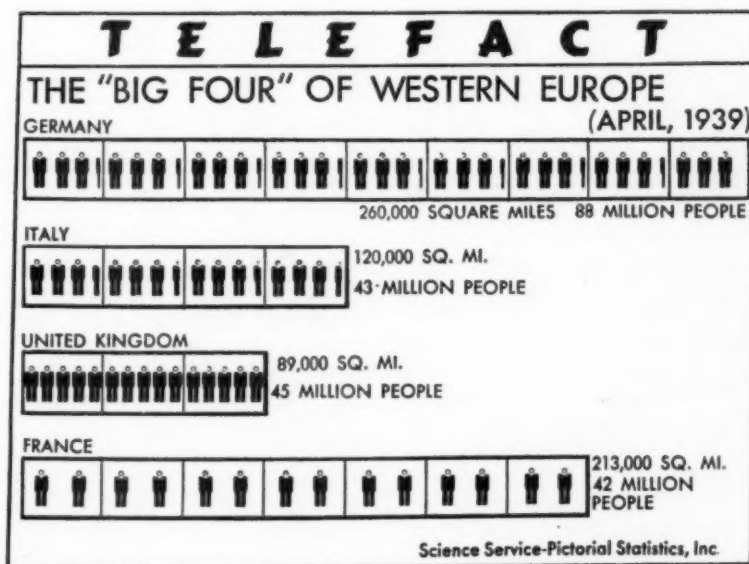
Raising the level of the average of the population nearly to that of the highest now existing is considered possible within a comparatively small number of generations, so far as purely genetic considerations are concerned.

Much more research in human genetics and in medicine, psychology, chemistry and the social sciences is advocated, with the improvement of the inner constitution of man as the central theme.

Text of Declaration

THE COMPLETE text of the statement on how the world's population can be improved genetically is as follows:

The question "how could the world's



population be improved most effectively genetically" raises far broader problems than the purely biological ones, problems which the biologist unavoidably encounters as soon as he tries to get the principles of his own special field put into practice. For the effective genetic improvement of mankind is dependent upon major changes in social conditions, and correlative changes in human attitudes.

Equal Opportunities

1. In the first place there can be no valid basis for estimating and comparing the intrinsic worth of different individuals without economic and social conditions which provide approximately equal opportunities for all members of society instead of stratifying them from birth into classes with widely different privileges.

World Federation

2. The second major hindrance to genetic improvement lies in the economic and political conditions which foster antagonism between different peoples, nations and "races." The removal of race prejudices and of the unscientific doctrine that good or bad genes are the monopoly of particular peoples or of persons with features of a given kind will not be possible, however, before the conditions which make for war and economic exploitation have been eliminated. This requires some effective sort of federation of the whole world, based on the common interests of all its peoples.

Children's Welfare

3. Thirdly, it cannot be expected that the raising of children will be influenced actively by considerations of the worth of future generations unless parents in general have a very considerable economic security and unless they are extended such adequate economic, medical, educational and other aids in the bearing and rearing of each additional child that the having of more children does not overburden either of them. As the woman is more especially affected by child bearing and rearing she must be given special protection to ensure that her reproductive duties do not interfere too greatly with her opportunities to participate in the life and work of the community at large. These objects cannot be achieved unless there is an organization of production primarily for the benefit of consumer and worker, unless the conditions of employment are adapted to the needs of parents and especially of mothers, and unless dwellings, towns and community services gen-

erally are reshaped with the good of children as one of their main objectives.

Birth Control Needed

4. A fourth prerequisite for effective genetic improvement is the legalization, the universal dissemination, and the further development through scientific investigation, of ever more efficacious means of birth control, both negative and positive, that can be put into effect at all stages of the reproductive process—as by voluntary temporary or permanent sterilization, contraception, abortion (as a third line of defense), control of fertility and of the sexual cycle, artificial insemination, etc.

Along with all this the development of social consciousness and responsibility in regard to the production of children is required, and this cannot be expected to be operative unless the above mentioned economic and social conditions for its fulfillment are present and unless the superstitious attitude towards sex and reproduction now prevalent has been replaced by a scientific and social attitude.

This will result in its being regarded as an honor and a privilege, if not a duty, for a mother, married or unmarried, or for a couple, to have the best children possible, both in respect of their upbringing and of their genetic endowment, even where the latter would mean an artificial—though always voluntary—control over the process of parentage.

More Knowledge

5. Before people in general, or the state which is supposed to represent them, can be relied upon to adopt rational policies for the guidance of their reproduction, there will have to be, fifthly, a far wider spread of knowledge of biological principles and of recognition of the truth that both environment and heredity constitute dominating and inescapable complementary factors in human well-being, but factors both of which are under the potential control of man and admit of unlimited but interdependent progress.

Betterment of environmental conditions enhances the opportunities for genetic betterment in the ways above indicated. But it must also be understood that the effect of the bettered environment is not a direct one on the germ cells and that the Lamarckian doctrine is fallacious, according to which the children of parents who have had better opportunities for physical and mental development inherit these improvements, biologically, and according to which, in consequence, the dominant classes and

peoples would have become genetically superior to the underprivileged ones.

Conscious Selection

The intrinsic (genetic) characteristics of any generation can be better than those of the preceding generation only as a result of some kind of *selection*, i.e., by those persons of the preceding generation who had a better genetic equipment having produced more offsprings, on the whole, than the rest, either through conscious choice, or as an automatic result of the way in which they lived. Under modern civilized conditions such selection is far less likely to be automatic than under primitive conditions, hence some kind of conscious guidance of selection is called for. To make this possible, however, the population must first appreciate the force of the above biological principles, and the social value which a wisely guided selection would have.

Health, Brains, Temperament

6. Sixthly, conscious selection required, in addition, an agreed direction or directions for selection to take, and these directions cannot be social ones, that is, for the good of mankind at large, unless social motives predominate in society. This in turn implies its socialized organization. The most important genetic objectives, from a social point of view, are the improvement of those genetic characteristics which make (a) for health, (b) for the complex called intelligence and (c) for those temperamental qualities which favor fellow-feeling and social behavior rather than those (today most esteemed by many) which make for personal "success," as success is usually understood at present.

A more widespread understanding of biological principles will bring with it the realization that much more than the prevention of genetic deterioration is to be sought for and that the raising of the level of the average of the population nearly to that of the highest now existing in isolated individuals, in regard to physical well-being, intelligence and temperamental qualities, is an achievement that would—so far as purely genetic considerations are concerned—be physically possible within a comparatively small number of generations.

Genius As Birthright

Thus everyone might look upon "genius," combined of course with stability, as his birthright. And, as the course of evolution shows, this would represent no final stage at all, but only

an earnest of still further progress in the future.

More Research Needed

The effectiveness of such progress, however, would demand increasingly extensive and intensive research in human genetics and in the numerous fields of investigation correlated therewith. This would involve the cooperation of specialists in various branches of medicine, psychology, chemistry and, not least, the social sciences, with the improvement of the inner constitution of man himself as their central theme. The organization of the human body is marvellously intricate and the study of its genetics is beset with special difficulties which require the prosecution of research in this field to be on a much vaster scale, as well as

more exact and analytical, than hitherto contemplated. This can, however, come about when men's minds are turned from war and hate and the struggle for the elementary means of subsistence to larger aims, pursued in common.

The day when economic reconstruction will reach the stage where such human forces will be released is not yet, but it is the task of this generation to prepare for it, and all steps along the way will represent a gain, not only for the possibilities of the ultimate genetic improvement of man, to a degree seldom dreamed of hitherto, but at the same time, more directly, for human mastery over those more immediate evils which are so threatening our modern civilization.

Science News Letter, August 26, 1939



FOR PROTECTION

This spool, made of porcelain wound with copper wire and coated with zinc oxide, was developed by Westinghouse to protect transformers against electrical failures.

PHYSICS

Only Radiation From Sunspots Causes Ionization of F₂ Layer

Only in the Center of the Solar Disturbances Is The Temperature High Enough To Produce Effects

THE IONIZATION produced in F₂ reflecting layer, 150 miles and more above the surface of the earth, is caused by intense radiation that comes from the regions around sunspots, Dr. Fred L. Mohler of the National Bureau of Standards suggests. (*Science*, Aug. 11)

By studying the reflections of short-wave radio signals reflected off the F₂ layer and correlating them with sunspot numbers, very good agreement has been found, Dr. Mohler explains.

Dr. Mohler has been seeking an explanation for this correlation and believes he has found it in studies of the wavelength of the light rays emitted by the sun's flaming surface. The rays from the

disk of the sun as a whole, intense though they are, do not have enough energy (are not of short enough wavelength) to produce the amount of ionization found in the F₂ layer.

Only in the center of the sunspots, or flocculi with which they are associated, is the solar temperature high enough to produce radiation sufficient to give the observed effects. While the normal temperature of the sun's disk is 6,000 degrees absolute, only one per cent of the whole disk needs to have a temperature of 7,500 degrees to account for the close correlation of sunspot activity and ionization in the F₂ layer.

Science News Letter, August 26, 1939

ENGINEERING

"Spool" Spots Hydrochloric Gas in Huge Transformers

A SMALL spool made of porcelain, copper wire and common zinc oxide is the newest guardian for huge power transformers invented by a 26-

year-old chemist at the laboratories of the Westinghouse Electric and Manufacturing Company.

Emerson Venable is the young scien-

tist who has developed this new detector for corrosive, hydrochloric acid.

This acid is created when the newest type of transformers develop short circuits. These transformers no longer contain oil, as formerly, but now owe their insulation properties to a non-inflammable liquid known as inerteen. When an electric arc burns in inerteen, as in a short circuit, hydrochloric gas forms.

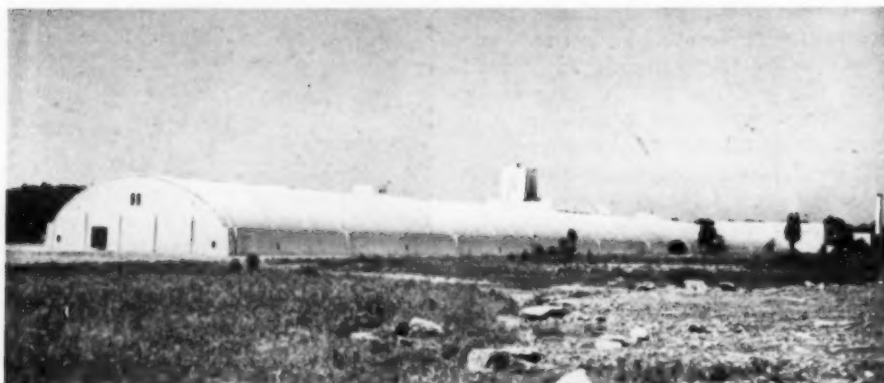
The new advance of Chemist Venable is a spool of porcelain on which are wound two copper wires carrying current and separated from one another by zinc oxide which provides electrical insulation. Zinc oxide, Chemist Venable has found, is especially susceptible to the fumes of hydrochloric acid.

As the acid attacks the zinc oxide its insulation properties quickly disappear and current "shorts" across the copper wires at this spot. This intentional short circuit trips a relay and throws off the huge current in the transformer.

Previous best protection for transformers was the use of a small diaphragm which broke when hydrochloric gas was created and built up ten pounds of pressure. The new device will detect as little as one ten-thousandth of a pound of hydrochloric acid.

Dr. Charles F. Hill, Westinghouse division manager on insulation, and J. C. Ford, section engineer, suggested the problem which has now been solved.

Science News Letter, August 26, 1939



FOR NAVAL RESEARCH

Birthplace of tomorrow's Navy fighting ships will be the huge new towing tanks at Carderock, Md. "Baby" hulls of ships are given exhaustive tests to show the qualities of full-sized vessels long before they ever reach the stage of actual construction.

ENGINEERING

Navy's Huge Test Basin Is Now Nearing Completion

World's Largest Towing Basin for Studying Ship Models Located Near Nation's Capital; One Tank 1,000 Feet Long

THE WORLD'S largest naval testing laboratory is taking shape today as a key part of the program which is to guarantee the United States a navy second to none and an adequate merchant marine.

Out of solid rock at a 106-acre site near Cabin John, Md., have been hewn four basins in which models will be made to yield information on how vessels ranging from motorboats to battleships and ocean liners should be built.

The Navy is now beginning to move equipment into its David W. Taylor Model Basin at Carderock Naval Station, to give the \$4,500,000 testing plant its full name. Begun two years ago, the first basin will go into service sometime next summer.

Accuracy is the watchword in the testing laboratory, where hulls will be towed through the tanks by giant carriages traveling on specially designed and laid tracks. Instruments will measure pressures and pulls; cameras will note the waves created by the 20-foot model hulls; records will be carefully kept and analyzed.

When the entire station is complete, some three or four years hence, the Navy will have a testing laboratory officers believe will be the finest in the world for years to come.

The four basins are housed in a long windowless arched structure of special design. Artificial light is used throughout. Natural light is difficult to control and may mean poorer pictures of what goes on in the tanks. Natural light, besides, encourages the growth of animal and plant life in the water and would increase the difficulty of keeping the water clear.

Giant carriages of unusual design will tow the 20-foot models at speeds up to 25 miles an hour in the three larger tanks, or will guide those that are powered with one-horsepower electric motors.

Only the carriage for the largest tank—1,170 feet long, 51 feet wide, and 10 feet deep—is being ordered now because naval officers wish to study how well it works. It will be ordered this fall and will be ready by the time technicians have finished laying the heavy track on which it will run. Because of the great accuracy required, track laying takes about 15 months. Allowance must be made for the earth's curvature.

Though the carriage spans the tank, it will be driven entirely from a single rail, on which it will rest through four steel-shod wheels. A rail on the other side of the tank will serve only as a support to the narrow end of the tri-

angular steel structure. The carriage, to be driven by electric motors, will weigh 30 tons. This single driving track type obviates the difficulty of lining up the tracks on both sides of the tank.

The other basins are smaller, one measuring 960 feet in length and 20 feet in depth, another about 600 feet with a part in which studies of ships making turns can be carried out, and the fourth measuring only 140 feet in length. A falling weight system instead of a powered carriage will move models across the smallest tank.

The models and the equipment used in testing them are expensive—about \$1,000,000 is to be invested in Carderock apparatus. Eight-inch propellers, cast from type metal in wooden molds, for self-propelled models cost \$100 apiece. Costly though model testing may be, it saves untold millions because it is cheaper to change the shape of a model than to alter the ship itself. Such testing also saves money by making ships more efficient.

The Navy will be delighted to have visitors watch the tests, for no naval secrets will be betrayed. Secrecy does not enter the picture until the test data have been computed; those will not be released. Carderock's facilities will be open to merchant ship builders as well as to the Navy, provided the private concerns pay the cost of the studies.

Research Crowded Out

Extensive general research projects, as well as studies connected with specific ships, are also to be carried out at Carderock. Little general research can now be done at the overtaxed Washington Navy Yard basin, whose single small tank is crowded with hulls for the naval and Maritime Commission programs. It was at the Washington Navy Yard 20 years ago that the efficient bulbous bow made famous by Germany's S. S. Bremen and S. S. Europa was invented.

Complete machine shop facilities for building models and for keeping the station's expensive equipment in repair are provided in a laboratory and administration building that runs the length of the basin building. A naval museum is also to be established. Water for the tanks is pumped up from the Potomac River, which runs just below the site.

The National Advisory Committee for Aeronautics has a longer towing tank, 2,600 feet from end to end, at its Langley Field laboratories, but it is designed for studying an entirely different type of problem. There a rubber-tired carriage tries out flying boat hulls and

seaplane pontoons at speeds up to 80 miles an hour. Carderock's emphasis will be on regular ships.

American warships and merchant vessels have for years enjoyed good reputations as outstanding design achievements. Some of the ships now joining an augmented fleet have been praised lavishly by foreign experts who are ordinarily jealous of any other nation's naval activities. Ships to be built five years from now will be even more efficient. The credit for those vessels to come will go at least in part to this new Navy testing plant.

Science News Letter, August 26, 1939

PALEONTOLOGY

Skull of Biggest Monster Arrives in America

THE MASSIVE skull of the biggest prehistoric sea monster ever found, a 60-foot plesiosaur which swash-buckled the oceans 120,000,000 years ago when dinosaurs ruled the earth, has been assembled and prepared for exhibition at the Harvard Museum of Comparative Zoology.

Authorities described the beast as "the most amazing specimen of its kind known to the world." It was discovered by William E. Schevill of the Museum staff in an exposed ancient sea bed in Queensland, Australia. Others have previously been found in various parts of the globe but never one even approaching this one in size.

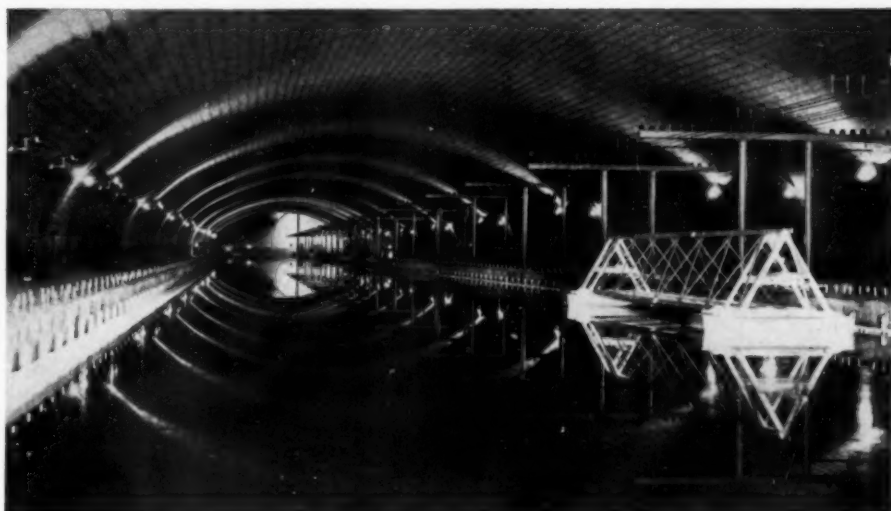
The skull measures 10 feet in length and three feet in height and has heavy alligator-like jaws studded with 92 interlocking spiked teeth from two to eight inches long. The specimen was prepared by George Nelson of the Museum staff.

Scientists have described the giant plesiosaurs as resembling in many ways the mythical sea dragons which terrified ancient mariners. They ranged in length from about 10 to 60 feet with long heads and stubby tails. They used four powerful paddle-like limbs to propel their tremendous turtle-shaped bodies through the water.

They were the greatest marine reptiles which ever lived, masters of their realms as the dinosaurs were on the land, and they roamed the great seas which covered most of the earth devouring fishes and reptiles in their mammoth jaws.

Both plesiosaurs and dinosaurs were confined to the Mesozoic era which extended from about 150,000,000 years ago to 100,000,000 years ago.

Science News Letter, August 26, 1939



TUNNEL-LIKE TANK

Perfect reflection off the water surface of the Navy's new towing tank at Carderock, Md., makes it hard to tell top or bottom of this interior view of the 1,170-foot tank. Sealed and air-conditioned, the tank will be the Navy's testing ground for models.

ASTRONOMY

Amateur Astronomers Can Make Vital Contributions

If You Have No Telescope, You Still Can Aid Science By Watching for Meteors and Occasional Aurorae

By **LESLIE C. PELTIER**

America's Foremost Amateur Astronomer

Eminent among American amateur astronomers is Leslie C. Peltier of Delphos, Ohio, toy designer by day and star gazer by night. Discoverer of seven comets in his 23 years of comet-hunting, his work is so valuable to astronomy that for the last 15 years Princeton Observatory has loaned him a fine six-inch refracting telescope for his self-appointed task of searching for comets and for studying variable stars. Mr. Peltier received honorary life membership in the Amateur Astronomers Association at its meeting in New York City, Aug. 19-20.

PROBABLY no other science has received so much advancement and development through the work of the amateur as has the science of astronomy. A large share of the important discoveries in the past were made by men who, whether from choice or necessity, earned their living at some entirely unrelated task.

But even the skill and genius of these earlier amateurs has far from exhausted the field and a wealth of opportunities still await those who have a genuine desire to be of service to astronomy.

For those with no other optical equip-

ment than a pair of good eyes there are dozens of meteors to be observed and plotted every clear night, there are occasional aurorae to classify and there is the ever-present Milky Way to scan in the hope of finding a new star.

Still more opportunities for original work are in store for the fortunate possessor of even a small telescope. The observing of variable stars is one of the most important fields of research in which the amateur can engage. Others may prefer the recording of sun spots, the careful watching of the surface markings of the brighter planets or the fascination of comet hunting. Those with a penchant for photography may wish to record auroral forms, meteor trains, or expose plates on the Milky Way in the hope of catching a nova in its early stages.

None of these astronomical by-paths requires any special mathematical training nor are large and costly instruments necessary. Of far greater importance is a plentiful supply of diligence and persistence.

Science News Letter, August 26, 1939

PUBLIC HEALTH

In Midst of War Scare Danzig Fights Cancer

THE STILL Free City of Danzig, Europe's present powder keg, is pushing the fight against cancer, regardless of what other forces she may shortly have to fight. Under a new health law, every woman over 30 years and every man over 45 years, the dangerous ages for cancer, can have a free medical examination every year in order to detect early signs of cancer.

The new law also provides for an administrative body to fight cancer by educational and other activities. Only doctors may treat cancer under the new law. Treatment by correspondence and other irregular and unethical methods is forbidden. Doctors who diagnose cancer are required to report the cases to the health authorities, and the cost of diagnosis is borne by the new administrative body that is fighting cancer.

Science News Letter, August 26, 1939

CHEMISTRY

War Gas Chemists Have Equation for Death

DEATH by Equation might well be the sub-title of a new chemical textbook, "The War Gases: Chemistry and Analysis," just published (D. Van Nostrand Co. \$7.50) and written by Dr. Mario Sartori of the Italian Chemical Warfare Service.

Did you know that chemical warfare experts have an equation for death? It is $C \times t = W$. "W" is the mortality-product, or the lethal index, of a war gas. "C" is the concentration of the substance in air expressed in milligrams per cubic meter and "t" is the time, in minutes, sufficient to cause death.

Another name for the "W" factor is the Haber Product, named after Germany's famous World War chemist who directed the concoction of many of the gases used early in the conflict.

The mortality-product gives the toxic power of the asphyxiating gases and those poisons absorbed through the skin. It cannot be determined on human subjects and the tests are ordinarily made on animals like cats, dogs or rabbits.

The toxic power of war gases is not solely bound up in the mortality-product, or the end result. Highly important is the "lower limit of irritation," the amount of the substance which will show pathological sensitivity. Here actual tests on human beings are employed and the

concentration of the gas, for example, is increased until the test subjects cry or sneeze or exhibit other known symptoms.

At the top in its irritating ability is the chemical, diphenyl chloroarsine, whose lower limit of irritation is only a tenth of a milligram of gas in a cubic meter. Chloropicrin and phosgene, better known perhaps, are 20 and 50 times less irritating.

Diphenyl chloroarsine, too, enjoys the unenviable distinction of heading the list on another important count; the limit of insupportability—the maximum concentration a man can breathe for one minute without injury. One milligram per cubic meter is the amount for deadly diphenyl chloroarsine. Chloropicrin, in contrast, requires fifty times the concentration to get the same effect.

No layman's book is Dr. Sartori's new text, for it contains straight chemistry in complete dosage to bring together all the scattered references from the literature on war gases and their properties.

Science News Letter, August 26, 1939

GENETICS

Halving the Chromosomes Next Step in Plant Study

NEXT step in making new plants to order will be just the reverse of the sensational doubling of the chromosomes technique—diploid plants made by the drug colchicine, which promises better cotton, tobacco, berries, etc.

Now geneticists are searching for a chemical that will halve the number of chromosomes—produce to order what are called haploids, which very occasionally occur naturally.

Chromosomes inside the germ cells are the bearers of heredity. All the inherited qualities of a plant (or an animal or even a human baby) are packed in their minute volumes. The doubled chromosomes allow a more successful and fertile blending of two different heredities, even two plants with different numbers of chromosomes. Just the reverse is the case in the hoped-for haploids. Inbreeding is desired, a sort of parthenogenesis, the chromosomes being halved in number can combine with themselves, under colchicine's influence, magnifying genetically the qualities of the plant. At Cold Spring Harbor, N. Y., on Long Island, Carnegie Institution of Washington's world-known geneticist Dr. Albert F. Blakeslee, who developed the colchicine technique, is trying all sorts of chemicals—200 so far—attempts of reliable creation of haploids.

Science News Letter, August 26, 1939

IN SCIENCE

GEOPHYSICS

Sunspots, Northern Lights, Disturb Telegraphy

SUNSPOTS, brilliant displays of northern lights, magnetic storms and interruption to telegraphic communication have coincided to give new evidence that there is some connection between spots on the sun and the magnetic condition of the earth.

The sun had a very unusual procession of sunspot pairs parading across it. A severe magnetic storm, accompanied by a very unusual display of aurora borealis, so brilliant that cars were able to drive without headlights, occurred on Friday night and Saturday morning, Aug. 11-12. Some telegraph lines that use the earth as one side of the circuit were temporarily put out of commission by the unusual electrical state of the earth.

As spots are still on the sun, more magnetic storms, aurora and accompanying effects may be expected.

Science News Letter, August 26, 1939

AGRICULTURE

Plow That Made Corn Belt Acquired by Smithsonian

THE SMITHSONIAN Institution has acquired an implement that had more to do with the winning of the West than even Daniel Boone's famous long rifle. It is the first steel plow forged by John Deere at Grand Detour, Ill., in 1837. Made of an old sawmill saw because other suitable steel was lacking, it was able to shear through the tough roots of the prairie grasses that balked the relatively feeble Eastern-type plows which the pioneers had brought with them.

The reputation of Blacksmith John Deere's steel plows spread, and presently he and his partner gave up general blacksmithing altogether and became specialists in plow manufacturing. In 1846 they turned out 1,000 sod-breaking plows—a mass-production figure, for those days.

The historic implement will be added to the collection of early American plows already in the Smithsonian Institution, some of which date back as far as 1797.

Science News Letter, August 26, 1939

NE FIELDS

ASTRONOMY

Giant Telescope Disk One Of Strangest Monuments

See Front Cover

ADD to the list of strangest monuments in the world one to glass and astronomy. The largest piece of glass in the world, the original and "spare" disk for the 200-inch telescope mirror, has been erected as a public exhibit in the public square of Corning, N. Y., not far from where it was poured in 1934 at the Corning Glass Works. It will become a tourist sight, it and its dome-shaped building advertised on postcards sent back home by thousands. Weight: 20 tons. Size: Nearly 17 feet in diameter, 27 inches thick. Color: Translucent, opalescent bluish white. The reason it is a monument instead of mirroring the universe for Hale Observatory, Mt. Palomar, Calif., is that slight defects caused by cores of the mold coming loose marred its perfection. Another disk was poured and actually used for the mirror.

Science News Letter, August 26, 1939

PHILOSOPHY

Explorer Doubts Greeks Invented "Liberty"

DID some wise human invent Liberty—or was it a pre-insect invention?

A shrewd guess that it was the latter is advanced by Arctic explorer Vilhjalmur Stefansson, who finds himself drawn into argument over "Who invented Liberty, anyway?" (See SNL, July 8)

Challenging Dr. Walter Woodburn Hyde, University of Pennsylvania's Professor of Greek, who recently declared that Liberty was the greatest invention of the Greeks, Dr. Stefansson wants to know, "What about the Eskimos?"

"Dr. Hyde may be right that the Greeks were first to theorize about Liberty," concedes Dr. Stefansson. "But Stone Age Eskimos of Coronation Gulf took it so for granted as recently as 1910 that they never theorized about it. To borrow an American phrase of 1776, they took the right to freedom as self-evident."

Dr. Hyde has traced the record of Liberty back to the historic council of Greek chiefs meeting outside the walls of Troy. Ideas of personal freedom were

then already formed in the minds of these thinkers, he concludes, and he speculates that the germ of the Liberty idea came perhaps from Greek ancestors migrating from the Danube.

But Dr. Stefansson argues that that isn't going nearly far enough back. He reasons that prehistoric man thousands of years before the siege of Troy enjoyed Liberty, even if he was not very articulate about it.

In fact, Dr. Stefansson doubts that man invented Liberty at all. Perhaps Liberty was merely here on earth—taken for granted by the dim-witted anthropoids, and by the little animals before them, and by the reptiles and the earliest insects before them.

"Perhaps," says the Arctic explorer, "Liberty was never invented. Perhaps the real invention was the abridgment of Liberty."

And even credit for thinking of that may not go to human thinkers. Dr. Stefansson says maybe human beings re-discovered curtailing of Liberty—an idea that insects or pre-insects invented.

Science News Letter, August 26, 1939

METEOROLOGY

"Weather by the Week" In Washington, D. C.

THE NATION'S capital gets its weather by the week, so that if it rains on Sunday it is likely to rain on several following Sundays.

The cycle is not exactly a week, but six days and 18 hours, explains Dr. Charles G. Abbot, secretary of the Smithsonian Institution, who with Miss Nancy M. McCandlish has just published the results of statistical studies on persistently rainy weekends, covering a period of 15 years.

The cycle is just one-fourth the time it takes a group of sunspots to make one complete rotation around the sun, so that apparently the phenomenon is connected in some way with sunspots, says Dr. Abbot.

Because the period is one-fourth of a day less than a week, the rainy Sunday "curse" can be expected to be lifted in about a month, by a one-day forward shift.

This actually happened during June and July of the present year. When the study was completed, in May, Dr. Abbot ventured the prophecy that June would have rainy Sundays and Tuesdays, and July rainy Saturdays and Mondays. The record shows maximum rainfall on Tuesdays in June and on Saturdays during July.

Science News Letter, August 26, 1939

PSYCHOLOGY

Meaning More Important Than Sound in Conditioning

ABOY'S mouth may be taught by experience or by a psychologist to water if he sees the word "cent" because he can buy candy with such a coin or because he is given candy when he sees the word. This is the good old conditioned reflex a la Pavlov.

Will it water, with no candy in sight, when he sees "scent" (homophone to "cent"—word with same sound but different meaning) or when he sees "penny" (synonym not sounding the same)?

That problem has been tested by Prof. G. H. S. Razran, Columbia University psychologist. Three subjects conditioned to words "style," "urn," "freeze," and "surf" flashed on a screen while they chewed gum, sucked lollipops, or ate tea sandwiches. Their mouths watered upon sight of the words alone with no food fed them. Then later flashed on the screen: "stile," "fashion"; "earn," "vase;" "frieze," "chill;" "serf," "wave." First word same in sound—second word same in meaning. Which received more transfer conditioning, for which was salivation greatest?

To the journal *Science* (July 28) Prof. Razran reports: By far the greater portion of the transfer conditioning went to synonyms (semantic conditioning) than to homophones. Verbal conditioning is primarily semantic, going with word meaning than with mere visual-auditory word form.

Science News Letter, August 26, 1939

CHEMISTRY

Colloidal Fuel from Coal Sought as Oil Substitute

ASUCCESSFUL and cheap method for manufacturing colloidal fuel from coal is being sought through an industrial research fellowship at Kansas State College.

Although colloidal fuel is not now being used industrially anywhere in the United States, investigations to date have offered promise of finding a technique which would be cheap enough to make it an important possibility for railroad fuel and for use in power plants where either fuel oil or pulverized coal is now burned.

Dean R. A. Seaton of Kansas State College's Division of Engineering, explained that a satisfactory colloidal fuel would help to utilize effectively the petroleum supplies of the United States.

Science News Letter, August 26, 1939

GEOGRAPHY

Antarctic Ho!

First Federally Sponsored Expedition to Antarctic Is Planning Special Clothing and Ways of Life

By LEONARD H. ENGEL

THE WORLD'S Greatest Unknown, a thousand-mile strip of coast Lincoln Ellsworth thinks he sighted from an airplane three and a half years ago and claimed for the United States of America, will be the goal of the first Federally-sponsored Antarctic expedition.

Two of the three expedition ships, which sail this fall from Boston with Admiral Richard E. Byrd in command, will try to penetrate forbidding ice that masks a shore stretching from Palmer Land nearly to Little America. Dense pack ice has prevented anyone from reaching it before.

The existence of a great "earthquake ring" rimming the Pacific Ocean may also be proved by the expedition by studies behind this unknown coast. Mountains Ellsworth sighted in November and December of 1935 are believed to connect the Rockies-Andes chain running down the west coast of the Americas, and the volcanic islands which rise out of the Asiatic shore of the Pacific. The Pacific's shores have long been noted for frequent and violent earthquakes.

The expedition will seek to establish two bases in the mysterious land Ellsworth named James S. Ellsworth Land for his father. A third will be at or near Little America, to the west of Ellsworth Land.

To Explore Interior

Its shore will be mapped and its interior explored once camp has been pitched and the Antarctic night has passed. Field parties will be sent out from each of the bases. The Armour Institute of Technology's giant "snow cruiser," entirely self-contained and with supplies for four men for a year, will be a fourth "Perambulating" base, if the "bus" proves satisfactory. Ellsworth Land is nearly a million square miles in area.

The belief in the existence of James S. Ellsworth Land rests chiefly on the fact that a coast must be where it is shown on the maps of the Antarctic. Lincoln Ellsworth flew over a high plateau as

he cruised westward from an island off Palmer Land just below the tip of Cape Horn to a point 15 miles from Little America. He also sighted mountains. Between the land below him and the limit of explorations by ship to the north must lie a coast. His pilot thinks he saw dark-reflecting clouds on the horizon, indicating open water beneath.

Detailed weather observations, studies of meteors which are especially frequent and bright during the Antarctic night, geological and mineralogical studies, studies of the earth's atmosphere and magnetism, cosmic ray measurements and other major scientific activities will also occupy the time of the men at the three bases. Twenty-two men will be left at each of two base camps, and 10 at a third, which is to be established if there is time to outfit the necessary ship. Scientists will be prominent members of the expedition.

Basis For Claims

The base camps, which may be maintained from year to year, will establish American claims to James S. Ellsworth Land and Marie Byrd Land even though the expedition's purpose, literally speaking, is not to claim land. That can be done only by the State Department in Washington. But the State Department believes that land claims are valid only if some degree of colonization and settlement has been carried out.

That is the crux of the present "dispute" among several powers over who owns what in the Antarctic, to which Australia and Germany are also to send expeditions this year.

Other nations, chiefly Great Britain, make a practice of basing claims solely on visits by explorers and do not consider attempts at settlement to be necessary. Great Britain claims pie slices of land from the coast all the way into the Pole.

Because her whalers and sea-faring explorers were active during the last century along Antarctic coasts and because of her method of making claims, Great Britain is apparently the biggest landlord "down under." An entire quarter-of-the-pie slice of Antarctica is the "Australian Dependency." The next quarter,

lying at the Pacific Ocean's southern edge, is also British. It is the "Ross Dependency," named for Sir James Ross, discoverer of the Ross Sea and the Ross Ice Barrier, on which Little America is perched. Little America is actually inside British territory and its use by two previous Byrd expeditions and by Ellsworth was a matter of courtesy which will probably be repeated this time. A thin slice within the "Australian quadrant" belongs to France. A small square within it is also claimed by Ellsworth.

The one-sixth-of-a-continent slice next to the Ross Dependency is Marie Byrd Land and Ellsworth Land, both claimed by the United States, though not yet formally. An adjoining one-sixth is British—the "Falkland Dependency," lying below the Falkland Islands and the tip of South America. The remaining sector is Norwegian. German whalers have also claimed a piece of that, but the Norwegians still say them nay. The German claim extends into the western hemisphere and is said to be a violation of the Monroe Doctrine.

The dispute will not become too heated, however, for interest in the Antarctic, except for whaling rights, is still a matter of science and the future. Low-grade coal is to be found there. But by the time it could become economical to mine it, mankind may not be using coal as a fuel. Some rare and valuable product may some day be found there, however. Who knows? Uncle Sam's expedition, at least, will have a crack at finding out. And it will give the United States the basis for some real claims and add to man's knowledge and conquest of the unknown at the same time.

Life Near Pole

Have you ever wondered what life at the bottom of the world would be like? According to the plans of the expedition, it will run something like this:

A sponge bath once a week and a quick duck into a sleeping bag to warm up. No outside assignments for a couple of days afterward. The shock to the body would be too great right after sponging. Once a week a change of clothes—garments take three or four days to dry and washing them is not too easy, so you don't change too often. Retirement when weary into a little semi-private cubicle in which is a

double-deck bed for you and your "room mate."

Three months of darkness outside, punctuated now and then by moonlight brighter than at home. The not-quite-white light of kerosene or electricity inside. Days when no man goes outside for fear of being lost in the blizzard. A continual round of scientific observations, keeping records and doing chores, inside and outside.

That's what it will be like at the base camps which will be established next December or January—during Antarctica's "warm" daylight summer.

Hundreds of thousands of dollars worth of equipment will be taken to make it possible for men to live and work on the most inhospitable shore "down under."

A giant "snow cruiser"—with four ten-foot wheels to grip the snow, an airplane carried atop and space and equipment enough to be a perambulating base for four men for a year—will be their most spectacular tool. With it, expedition members hope to penetrate hundreds of miles into territory never seen.

Dogs, Too

Six Army tanks, stripped of guns and armor plate, will serve in place of tractors that might otherwise cost a cash outlay the \$350,000 expedition cannot afford. At least one Navy plane will be at each base. Dogs to the number of 170 will be down on the ice too.

Food costing a dollar a day per man for two years will be provided. The extra year's supply will be on hand in case an expedition ship cannot make her scheduled return to a base at the end of the first year.

The men will live in wooden bunkhouses whose seams will be made as airtight as possible to keep out Antarctic drafts. Floors will be raised for warmth. On the last two Byrd expeditions, except for one special case, floors were not raised and the men could never take off their fur boots, it was so cold.

Each man will have \$250 worth of special Polar clothing—mukluks (fur boots), parkas or fur hoods, an eiderdown sleeping bag and other garments now being made by Alaskan Eskimos working under the Division of Arts and Crafts of the Office of Indian Affairs. Special tight-woven cotton airplane fabric clothing will also be used to keep out the penetrating wind.

Caribou and reindeer sleeping bags and other special garments for field parties are also being prepared to the tune of \$7,000. Eiderdown sleeping bags, for



BIGGEST TIRE

It is for the snow cruiser to be used on the U. S. Antarctic expedition. Examining it are Dr. Henry T. Heald, president of Armour Institute of Technology, Dr. Thomas C. Poulter, designer of the cruiser, and Paul W. Litchfield, president of Goodyear, makers of the tire.

example, cannot be used on the trail because it is so much colder: moisture from the sleeper's body would freeze. If the fur bags freeze, they can be turned inside out and the ice brushed out.

While at the base, the men will be served almost every kind of food eaten at home—provided it comes in cans. Seal meat provides the vitamins and other essential features of scurvy-preventing fresh foods. On the trail, however, their fare is limited by what can be carried: their rations then will be heavy in pemmican, chocolate, sugar, tea, dried milk and dried fruits.

Photographic Equipment

A supply of specialized photographic equipment for mapping and for making a record of the expedition and of the data it gathers will be among the scientific equipment to be carried. Tools and spare parts will be taken also, for each base must be self-sustaining. The base camps will communicate with each other and their field parties by radio; Naval communications will keep the parties in touch with the outside world, via the Arlington naval radio station. A news bulletin of events at home may also be provided; a limited number of personal messages will be the expedition members' way of "writing" to the folks back home.

A full year will be lost if the expedition does not leave Boston in October. If it leaves later, there will not be time enough to build its bases, which require two to two and a half months to set up, before the Antarctic night begins, in mid-March. The ships would then have to wait until the following daylight period, more than three months later. And by the time they then got the bases erected, there would be little opportunity for exploration before winter night once more overtook the Antarctic continent.

The U. S. Antarctic Expedition de luxe will be safe, comfortable and efficient. Polar argosies were not always so.

Explorers to learn what equipment and methods are really needed, and a Machine Age to provide them both had to precede the well-fitted expeditions of today. A century and a half of suffering and heartbreak had to come first.

Far North Friendlier

The Far North has taken more lives than the Far South. But the Far North is nearer and friendlier. Many more have turned their steps northward to the Arctic. The Far South is not less dangerous. No North Polar adventure, for example, can match the saga of

Robert F. Scott of His Majesty's Royal Navy 27 years ago.

Forward, always forward, the stubborn-44-year-old officer-explorer urged his four companions in December of 1911. Lt. E. R. G. R. Evans, with the last supporting party, had been sent back from south latitude 86 degrees 56 minutes.

Sixty-nine days of bitterly cold toil. Then, a sight with a sextant, a moment of calculation. Ninety degrees south—the Pole at last! Where others had failed, he, Capt. Scott, and Wilson, Bowers, Edgar Evans and Oates, had succeeded!

But the cries of joy congealed in their throats. They saw a flag, a tent and notes. Amundsen of Norway had been there first—a month before.

Capt. Scott and his loyal four could not conceal their disappointment. To have risked so much and won so little. He erected a cairn marking the date. The five turned back.

The weather on their return from the lofty plateau on which the bottom of the world is situated was the worst anyone had known.

Evans, huskiest of the five, fell accidentally, sickened and died. Capt. Oates grew weak as the food grew short. He became a burden to the remaining three, and brooded over it.

"Going Outside"

"I am just going outside, and I may be some time," he said one night. Oates never came back from the blizzard. He knew he would not.

Scott, Bowers and Wilson struggled on. Eleven miles from a food cache, they pitched camp to wait out a storm. They waited in vain. Death by starvation overtook them first. Their tent and their bodies were found by a group from their base camp a year later.

The Antarctic has been a tougher nut for explorers than the Arctic for several reasons. It is possible, as Vilhjalmur Stefansson showed a generation ago, to live off the country in many sections in the North. It is not possible in the Antarctic. All food must be carried. It is colder in the Antarctic and the Polar Ice Cap is larger than that in the North. Because no large continents are nearby, Antarctica is also more inaccessible. The history of South Polar exploration is briefer than that of the North.

Roald Amundsen, Norwegian explorer who later flew over the North Pole in the dirigible Norge, was the first to reach the South Pole. A dash by dog sled brought him to Ninety Degrees South on Dec. 14, 1911.

Only 138 years before Capt. James Cook, who sailed around the continent without ever sighting it, and who explored the South Sea Islands and the Australian coast, crossed the Antarctic Circle for the first time.

British and American geographers are currently disputing the first discovery of the Antarctic Continent itself. Led by Prof. William H. Hobbs of the University of Michigan, who has found a map he contends supports American claims, the Americans credit a whaling boat captain from Stonington, Conn., hardly out of his 'teens, Nathaniel Brown Palmer, with sighting Palmer Land in 1820. The British attribute the continent's discovery to John Biscoe, a whaler sent out by the Enderby firm of

London, in 1830. Two years later Biscoe also sighted Palmer Land and renamed it Graham Land. Enderby whalers made many discoveries in the Antarctic.

English explorers were particularly active in the Antarctic, contributing many names to the roll of honor: Sir James Ross, who found the Ross Sea and the great ice barrier that also bears his name; Sir Ernest Shackleton; Prof. T. W. E. David, who found the South Magnetic Pole in 1912; and Sir Douglas Mawson are among them. Though American whalers were active in the South through the middle of the nineteenth century, it is not until the modern era of Byrd and Lincoln Ellsworth that the headlines and the accomplishments came the American way.

Science News Letter, August 26, 1939

GEOGRAPHY

Development Corporations Proposed for Alaska

Like the Famous "Hudson's Bay Company" They Would Turn It Into Prosperous "Scandinavia of the West"

FORMATION of one or more private development corporations like the world-famous "Hudson's Bay Company" to people Alaska with American citizens and refugees and turn it into a prosperous "Scandinavia of the West" is suggested in a Department of Interior report just published.

A population of five million or more, the report maintains, can easily be supported in the territory which, one-fifth the size of the United States, now has less than 60,000 inhabitants, including Eskimos and Indians.

Opening up the territory to large-scale colonization would provide a market for American capital goods equivalent to a heavy increase in the U. S. foreign market, it is urged. At least half the settlers will be American citizens. Among the others would be carefully selected refugees from foreign lands. The plan would thus also be an American answer to European persecution of minorities.

Private development corporations like the Hudson's Bay Company, which settled Canada, and the Plymouth Company, which sent the Pilgrims to the then unknown wilderness of the Atlantic coast, have been the most successful type of colonizing agency. One or more of them is therefore recommended for Alas-

ka. Their dividends would be limited and their activities carefully delineated by law. Financing would be entirely private.

Providing the plan secures support of Alaskans and others concerned, necessary legislation is expected to be introduced into the next session of Congress.

Present immigration laws would be modified so as to permit aliens selected by the companies to settle in Alaska. Immigration quotas of the United States would not be altered. If the Alaskan settlers wished to become citizens or to enter the United States, they would have to apply for immigration quota numbers like any other aliens. At least one large refugee-aid group is definitely interested.

Sponsors of the plan favor the establishment of more than one corporation. "Competition will be good for them," one declared. Besides, where diverse national and cultural groups are involved, they are likely to work better if each is allowed to work out its own problems instead of all being forced together into one company.

The society the colonists would build would be based primarily on manufactures exploiting Alaskan resources. The industries either would not duplicate

those of the United States at all or would produce goods of a type now largely imported. Among the industries are paper manufacturing, lumbering, salting and pickling herring, woodworking, production of minerals such as tin, manganese and chrome ores, fur farming and leather working. Agriculture can supply a substantial part of the new native's food supply, although by no means all of it.

Alaska is potentially richer than Sweden and Finland together, a National Resources Committee report quoted by sponsors of the plan indicates. With an area two-thirds larger and far better endowed by nature than the two Scandinavian countries, it now supports a population 1/165th as large. Half the population is Eskimo and Indian.

The peak of the white population, 31,400, was reached in 1910. Today whites total but 28,631. Many who went north in gold rush days 40 years ago returned; those who remained were frequently single and are now aging bachelors. There are 228 men for every 100 women in the territory. This spells an extremely low birth rate. The World War and the influenza epidemic of 1919 took an unusually heavy toll.

Need Transportation

Because adequately-financed development organizations have been conspicuous by their absence, Alaska has been unattractive to settlers. Greatest Alaska need and its greatest hindrance in the past is the lack of transportation. The tracks of the Alaskan Railroad are less than 800 miles long. Roads are few and far between. Pacific Alaska Airways, Pan American subsidiary, has been having a hard struggle to keep going in a sparse population and a small market.

Eighty-five per cent of employed Alaskans work for the fisheries and canning plants, which are operated during the summer months only. More than half the fishing industry's labor comes from the United States for the duration of work and then returns home.

Almost all the wealth extracted from the territory has been drained out of it by absentee landlords. Money earned by the fishery workers as well, for example, is to a great extent spent in the states and not returned to the territory.

The territory, as a consequence, has been a considerable drain on the Federal government. Most communities are unable to raise in taxes the sums which must be spent on them. The settlement company plan grows out of an investigation ordered last spring by Secretary

of Interior Ickes to determine what could be done to alter the situation.

Immigrants, whether American citizens or aliens, would all be carefully selected for the skills and trades needed in pioneer communities. The first large batches of colonists would be preceded by town planners, industrial experts and others with the special knowledge necessary for getting the projects started. The southeastern shore and islands would be settled most heavily because of their

favorable climate, resources and location.

The companies would devote a great deal of money and effort to providing cheaper transportation. This would not only lower the present fantastically high cost of living, but would provide Alaskan industries a means of reaching the market. Present projects for a Seattle-Juneau airline and a U. S.-Alaska highway would fit neatly into the company activities.

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AERONAUTICS

C. A. A. Chairman Writes Open Letter to Young Pilots

Urges That "Epidemic of Transatlantic Foolishness" Be Stopped Before More Lives Are Sacrificed

CHAIRMAN Robert H. Hinckley of the Civil Aeronautics Authority took time off from a visit to his Ogden, Utah, home to pen an open letter to the young pilots of America, appealing for an end to the "epidemic" of attempts to fly the Atlantic Ocean in light planes.

Moved by the probable deaths of Alex Loeb and Dick Decker, unreported since they took off from Nova Scotia for Ireland in a light plane on August 11, the C.A.A. chief wrote "let's stop this epidemic of transatlantic foolishness before it goes any further." Loeb and Decker are the third and fourth to lose their lives in such attempts this year.

Flights such as theirs contribute nothing to aviation and serve only to make more difficult aviation's job of presenting itself to the public as a safe form of transportation and sport, he declared.

The text of Mr. Hinckley's letter follows:

Dear Young Pilots of America:

I am writing you today because two more of the young people on whom aviation's future depends have just needlessly and foolishly thrown away their lives in an ill-prepared attempt to fly the Atlantic Ocean. They are the third and fourth so to die this year.

American flying boats have conquered the Atlantic for aviation. Their arrivals and departures are now so regular they rate press notices only if distinguished passengers are aboard. Yet young Decker and young Loeb had to perish. It would have been a miracle had they succeeded. You know why as well as I.

Their plane was so small it could not

carry any gasoline reserve. They had a 25-hour supply for a flight they expected to take more than 23 hours. Commercial transatlantic operators insist on a five-hour fuel reserve for a faster type of plane. Loeb and Decker's little monoplane could not carry proper navigation instruments. They had no radio to guide them or bring them weather reports. They could not know what lay ahead. They did not have adequate training for such a venture. Their way is not the way to fly an ocean. Twenty years of sacrificed lives and effort have proved that.

Even if they had reached Europe safely, they would have contributed nothing to aviation. Progress in the air does not lie along the path they took. They would have gained a transitory empty glory—that is all. A year from now they would have been completely forgotten.

Willingness to take a chance is one

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of youth's priceless attributes. But there are enough risks worth taking because the common good will be advanced, without looking for useless ones. A corollary of the old saying, "nothing ventured, nothing gained," is the thought, "nothing should be ventured where nothing can be gained."

The future of aviation depends to a great extent on our winning public acceptance of flying as a safe form of transportation and of sport. Loeb's and Decker's ill-fated attempt certainly does not help us to put this idea across.

PHYSICS

Cosmic Ray Experts Sail For Round-World Test Trip

PROF. Robert A. Millikan, California Institute of Technology Nobelist, is leading a party of cosmic ray research explorers on a round-the-world trip which will not end until early in 1940.

On Aug. 16, Prof. Millikan with his assistants, Drs. Victor Neher and W. H. Pickering, sailed for Australia treasuring a cargo of precious cosmic ray meters and small balloons with which they will probe cosmic ray intensities near the top of the atmosphere. Mrs. Millikan accompanies the party.

The itinerary calls for a route to Australia, Tasmania, the East Indies, India, Egypt, and then to Europe.

Measurements will be made at heights up to 15 miles and more. The instruments will record the temperature and pressure at these great heights as well as cosmic radiation. In India, the scientists will depend upon having their apparatus picked up and returned for study after its ascent and fall. Over the ocean and in less populated regions special apparatus will be employed which records the observations and continuously

We have imposed stringent penalties for taking part in and aiding such pointless flights. We intend to enforce them. But something more than mere administration of the Civil Air Regulations is needed.

So, as chairman of the Civil Aeronautics Authority, I appeal to you for your cooperation. Let's use planes only for the purpose for which they were built. Let's fly safely and sanely. Let's stop this epidemic of transatlantic foolishness before it goes any further.

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sends them back by radio to the scientists on the ground.

If these new instruments prove sufficiently accurate it will be unnecessary thereafter to restrict experiments to well populated regions where there is a good chance to recover fallen instruments and study their records. It will then be possible to investigate the cosmic radiation high up in the atmosphere over land or sea, in the deserts or in the Arctic regions where observations are badly needed.

Much of the journey of Prof. Millikan and his group will take them south of the earth's magnetic equator into a region where cosmic rays have been all too little studied. New and important knowledge of these mysterious, piercing radiations is virtually certain to come from the work of the expedition.

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A German inventor has devised a way of making shoe soles "incredibly durable" with a renewable coating mixed with sand or other granular material.

PSYCHOLOGY

Survival of Superstition Laid to School Methods

THE question of what educates a person for successful living is of more importance today than ever before because of the critical state of our civilization not only abroad but here in America. It is fundamental in judging whether our schools and colleges are doing a good job, whether our teachers are using the right methods, whether our people are being trained to think for themselves and tackle their daily problems rationally and successfully.

Worrisome are some of the evidences of failure reported by Prof. Otis F. Curtis of Cornell in a recent address at a scientific meeting. He reports that a professor of a scientific subject in a university of high standing let his son die of appendicitis without even consulting a physician; he had become a faith healer. Another professor with a national reputation in the field of economics recently said: "Vaccination and serum treatments are all bunkum." Chain letters, promising good luck if forwarded and bad luck if the chain was broken, were received from two Ph.D.s, whose "superstitious fears made them uneasy and perhaps even afraid to break the chain." There are many other cases of individuals with extensive schooling who fail to use "common sense." The medicine man, the believer in witchcraft and the voodoo priest practice in our midst today, called by more high-sounding names.

Some of the difficulty lies in the method of teaching, in Prof. Curtis' opinion. No schooling can hope to give the answers to all problems that might arise, but there is much more transfer of the right sort than is commonly recognized. Successful teaching will develop one's attitude or method of approach to a problem; that is, approach with an open mind, without prejudice; an attempt to ascertain all possible facts bearing on the matter; a search for opposing evidence; a critical weighing of the evidence; a recognition of what constitutes evidence; a readiness to recognize possible complexities and contradictory evidence; and perhaps that all the evidence is not yet at hand.

No one subject or field has a monopoly on such training in critical method, but, unhappily Prof. Curtis finds that much of the schooling even in colleges and universities is not of such a nature as to give this training.

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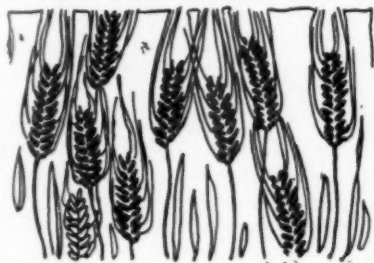
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Short-Lived: Many-Seeded

OUR DAILY bread is made from the seeds of a few species of grass: wheat, rye, barley, oats; in the New World corn, in southeast Asia rice; in Africa and some parts of Asia the millets. Diverse in form and manner of growth as they are, they have one thing in common: they are all short-lived, all annuals.

We grow many kinds of perennial plants for use and pleasure. Some of them live for decades, even for centuries, like the carefully kept apple and orange and olive trees in ancient orchards. But for the satisfaction of our most basic needs, we turn to "the grass which perisheth." Why?

Precisely because these grasses do perish. They can provide for the future, can perpetuate their species, only by means of seed. Perennial plants survive in their own individual selves, can throw up new shoots from runners, roots and underground stems, can produce bulbs and other organs of vegetative reproduction. Some of the long-lived species

of bamboo will produce only one crop of seed in thirty years or more, and there are some kinds of bushes that have never been known to bear fruit or seeds.

But the annual plants are going to die when frost comes. Not only that, a large proportion of any crop of seeds is sure to die, frozen or drowned or rotted or denied sprouting moisture by merciless drought. So every successful annual plant bears huge numbers of seeds, far more

than enough to maintain the species at its usual level in the general plant population.

In cultivating the grains and other annual seed crops we take advantage of this prolific tendency. In breeding them for new and improved varieties and strains we do all we can to encourage this trend to bear unusually heavy crops of seeds.

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METALLURGY

Nazis Seek Purer Iron Because Steel is Arsenic "Poisoned"

Percentage of Impurity Is Constantly Increasing Due to Repeated Use of Scrap Iron in Germany

GERMANY'S iron, so necessary for armaments, is being slowly "poisoned" by arsenic and that nation thus has a good reason to seek iron ore from other countries.

This is revealed in a letter from a German metallurgist published in the journal of the American Society for Metals, *Metal Progress*.

German ore contains up to 0.20% arsenic as compared to American ores which in most cases show no arsenic. Arsenic is transferred to the pig iron and eventually to the finished steel, writes H. Hougardy of the Deutsche Edelstahlwerke at Krefeld, Germany. He points out that metallurgical processes now in use do not remove arsenic, hence the percentage of the impurity in German steels is constantly increasing due to the re-use of scrap iron, at present in great demand in Germany.

High speed steel, the type used in the all important machine tools, is particularly affected.

"Cutting efficiency is impaired even by small amounts of arsenic," Metallurgist Hougardy writes. "In one type steel, the cutting efficiency is reduced about one fifth."

In soft steel, weldability is greatly impaired by the presence of arsenic. Especially is this true of flame welding where small amounts of the impurity retard welding progress. Presence of greater amounts makes flame welding impossible. This handicap is noted especially with regard to steels for armament construction.

The Hougardy letter has brought comments from American metallurgists and

European observers. Gist of their observations follows:

1. If Germany is forced to rely upon its own ore in time of war or under economic stress, the quality of steel products and fighting equipment produced within the Reich must necessarily be below that of countries having either better ore available for armament construction or facilities for obtaining American steels which are notably higher in efficiency.

2. Germany's assistance to the Franco cause in Spain was motivated to a certain extent by its need for additional and better ore. Though Spanish ore is known for its high sulfur content, it is valuable since sulfur can be removed by known methods—and that sulfur be converted to sulfuric acid. The ore from Spain is comparatively pure after this operation and is thus far superior to the best German ore.

Closer ties with Spain means a second German accomplishment: Cutting off of a fair percentage of Great Britain's ore supply. The British have received a portion of their ore from Spain for many years. Such importations are said to have already begun to decrease since the Franco victory.

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● Earth Trembles

Information collected by Science Service from seismological observatories resulted in the location by the U. S. Coast and Geodetic Survey of the following preliminary epicenters:

Friday, August 11, 9:07.25 p.m., E.S.T.

In the Queen Charlotte Islands in the South Pacific. Latitude, 12 degrees south. Longitude, 168 degrees east.

Saturday, August 12, 4:49.50 a.m., E.S.T.

In the Kurile Islands, north of Japan. Latitude, 45 degrees north. Longitude, 152 degrees east.

Wednesday, August 16, 12:07.0 p.m., E.S.T.

Off the Pacific coast of Guatemala. Latitude, 13 degrees north. Longitude, 91 degrees west. Moderate.

Friday, August 18, 5:16.0 p.m., E.S.T.

In South Pacific ocean, near New Hebrides islands. Latitude, 18 degrees south. Longitude, 168 degrees east (approximately). Strong shock.

For stations cooperating with Science Service, the Coast and Geodetic Survey, and the Jesuit Seismological Association in reporting earthquakes recorded on their seismographs, see SNL June 17.

● RADIO

Dr. Karl F. Meyer, director of the Hooper Foundation, will be the guest scientist on "Adventures in Science" with Watson Davis, director of Science Service, over the coast to coast network of the Columbia Broadcasting System, Monday, September 4, 5:45 EDST, 4:45 EST, 3:45 CST, 2:45 MST, 1:45 PST. Listen in on your local station. Listen in each Monday.

•First Glances at New Books

Medicine

EPIDEMIC ENCEPHALITIS (Third Report by the Matheson Commission)—Willard C. Rappleye, Chairman—*Columbia Univ. Press*, 493 p., \$3. This highly complicated disease has been subjected to attack by this group for over a decade. In this volume, long continued follow-up of patients, laboratory work and a comprehensive bibliography are included.

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Economics

THE INTERNATIONAL DISTRIBUTION OF RAW MATERIALS—Herman Kranold—*Harper*, 269 p., \$3.50. A dispassionate study of a ticklish technical and social problem, one of Europe's most menacing political footballs. Dr. Kranold's study covers nearly all the important raw materials and is heavily buttressed with statistics from European sources. The point of view is that of the economist, and wartime strategy of raw materials is touched on only indirectly.

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General Science

GERMAN-ENGLISH SCIENCE DICTIONARY—Louis De Vries—*McGraw-Hill*, 473 p., \$3. A handy key to the German literature on science, particularly useful to students in the agricultural, biological and physical sciences, compiled by the Iowa State College's professor of modern languages with the assistance of scientists at that university.

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Chemistry

EXPLOSIVES, MATCHES AND FIREWORKS—Joseph Reilly—*Van Nostrand*, 172 p., \$3. From the professor of chemistry at the University College, Cork, Ireland, comes this book which discusses the manufacture and testing of explosives, matches and fireworks.

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Medicine

TEXTBOOK OF PATHOLOGY—Charles W. Duval and Herbert J. Schattenberg—*Appleton-Century*, 681 p., \$8.50. The authors, professor and associate professor of pathology and bacteriology at Tulane University School of Medicine, have endeavored in this text to correlate pathology with clinical medicine.

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Public Health

THE HEALTH OF COLLEGE STUDENTS—Harold S. Diehl and Charles E. Shepard—*American Council on Education*, 169

p., \$1.50. This study, prepared for the American Youth Commission, should be of great interest to college and secondary school administrators and the staffs of their health departments. The authors outline the health problems of this group of older youths, tell how they are being met in schools and colleges in general, and make many suggestions for improving health services to this group of young people.

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Agricultural Economics

OUTLINE OF AGRICULTURAL ECONOMICS—G. W. Forster, Marc C. Leager, S. L. Clement and M. Taylor Matthews—*Edwards*, 89 p., \$1.50.

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Library Science

RESEARCH FACILITIES OF THE INTERNATIONAL LABOUR OFFICE AVAILABLE TO AMERICAN LIBRARIES—Joseph B. Rounds—*American Library Assoc.*, 70 p., 75c. A comprehensive description of a library established in 1920, now containing approximately 400,000 books and pamphlets covering every phase of the material on labor problems.

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Biology

SPONGES COLLECTED ON THE PRESIDENTIAL CRUISE OF 1938—M. W. De Laubenfels—*Smithsonian Inst.*, 7 p., 10c.

POLYCLAD WORMS COLLECTED ON THE PRESIDENTIAL CRUISE OF 1938—Libbie H. Hyman—*Smithsonian Inst.*, 10 p., 10c.

ALGAE COLLECTED ON THE PRESIDENTIAL CRUISE OF 1938—William Randolph Taylor—*Smithsonian Inst.*, 18 p., 15c.

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Archaeology

ANCIENT MAN IN NORTH AMERICA—H. M. Wormington—*Colorado Museum of Natural History*, 80 p., 30c. In popular leaflet form, the discovery record of early Americans is brought up-to-date, with pictures of Folsom, Yuma, Lake Mohave, and other type artifacts, and a glossary and bibliography added.

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Chemistry

USES AND APPLICATIONS OF CHEMICALS AND RELATED MATERIALS—Thomas C. Gregory, comp. and ed.—*Reinhold*, 665 p., \$10. Here is a most valuable reference book in the chemical field which indicates, in alphabetical order, the uses of chemicals and chemical compounds, numbering 5,167. Valuable, too, will be the synonyms of the various compounds.

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Horticulture

CHEMICAL GARDENING FOR THE AMATEUR, Gardening Without Soil Made Easy—Charles H. Connors and Victor A. Tiedjens—*Wise*, 253 p., \$1.95. Perhaps the liveliest interest in new methods for cultivating plants without use of soil has been on the part of amateurs. This newest addition to the literature of soilless gardening is primarily for this group who want to undertake experiments in this inviting field as a serious scientific hobby.

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Hygiene

SHORT STATURE AND HEIGHT INCREASE—C. J. Gerling—*Harvest House*, 159 p., \$3. While this book will disappoint the person who believes he can find a quick way to add inches to his stature, it contains much practical and sound advice on what can be done to appear and to feel taller.

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Public Health

TAKING CARE OF THE FAMILY'S HEALTH; A Teaching Guide for Rural Classes—Elma Rood and Gertrude Lingham—*Rural Press*, Pts. I and II, 598 p., fabricoid \$6.50, cloth \$5. This book is designed for public health nurses, teachers of home economics and members of health department staffs, and should help them in their task of adult health education.

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Inventions

PATENTS AND THE PUBLIC INTEREST—H. A. Toulmin, Jr.—*Harper*, 205 p., \$2.50. An evaluation of the patent system by a patent attorney. Telling how the patent system works, denying many faults often charged to patents, such as promotion of monopolies, suppression of patents, displacement of labor, and throttling of research, Mr. Toulmin suggests changes such as publicity for patent applications, less conflict between patent office and courts, etc. Recent results of invention are also summarized effectively.

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Astronomy

BEYOND YONDER—Oliver J. Lee—*Chapman & Grimes*, 169 p., \$2.50. This little book is one of the best expositions of astronomy for the layman which has appeared in some time. The style is clear and understandable and the illustrations and diagrams good.

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